

For Immediate Release



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AUB researchers use the power of the sun to neutralize drugs in drinking water

When we think of water pollution we often think of the run off from large chemical companies, massive oil spills, or perhaps the presence of bacteria that will make us ill. However, the drugs we each take to relieve every day aches and pains are finding their way into the water supply and into our drinking water in ever-greater concentrations. When we take a pill not all the drug is absorbed into our body. Without thinking many of us also dispose of unused medicines by washing them down the drain. Trace pharmaceuticals are now found throughout the world in surface water, ground water, and in our coastal seawater.

The need to improve our understanding, behavior, and the processes required to purify our water for drinking has never been more urgent. In a recent article appearing in *Science of The Total Environment* journal, a team of researchers at AUB: Dr. George Ayoub, a civil engineer; Dr. Mahmoud Al-Hindi, a chemical engineer; Dr. Antoine Ghauch, a chemist; and Abbas Baalbaki a graduate student in the environmental technology program, report their findings on the fate of five common chemically distinct pharmaceuticals that might be present in the water that you think of as clean. Because most pharmaceuticals are designed to be thermally stable and they are known to be light sensitive, experiments to discern the effects of light, heat, and the combined effect of light and heat on each of the drugs were undertaken. Ibuprofen, diclofenac, carbamazepine, ampicillin, and naproxen were carefully studied as they passed through the distillation process of a low cost solar still. The experiments were set up on the roof of the CCC-scientific research building at AUB. Three environment factors were monitored throughout this study, namely, temperature, solar radiation intensity, and ultraviolet radiation intensity.

The results indicated that solar stills are highly effective in removing several of the pharmaceuticals. Three of the pharmaceuticals tested, (ibuprofen, carbamazepine, and naproxen) required the effect of light and temperature combined to degrade significantly. But the results are not simple... some of the byproducts, after exposure to direct sunlight, were transferred to the

distilled water. Naproxen resulted in an array of up to ten different unidentified byproducts some of which may be more toxic than their parent compound.

There is obviously more work to be done to ensure that we have clean, safe drinking water. Working together AUB chemical engineers, chemists, and civil engineers are doing the vital research required to meet the growing challenges of modern life.

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Note to Editors

About AUB

Founded in 1866, the American University of Beirut bases its educational philosophy, standards, and practices on the American liberal arts model of higher education. A teaching-centered research university, AUB has more than 700 full-time faculty members and a student body of about 8,500 students. AUB currently offers more than 130 programs leading to bachelor's, master's, MD, and PhD degrees. It provides medical education and training to students from throughout the region at its Medical Center that includes a full-service 420-bed hospital.

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